

TECHNICAL REPORT

Contract Title: Infrared Algorithm Development for Ocean
Observations with EOS/MODIS
Contract: NAS5-31361
Type of Report: Quarterly
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MODIS INFRARED ALGORITHM DEVELOPMENT

A. Near-Term Objectives

- A.1 Continue interaction with the MODIS Instrument Team through meetings and electronic communications.
- A.2 Continue algorithmic development efforts based on experimental match-up databases and radiative transfer models.
- A.3 Complete 1988 extractions for global in situ drifting buoy validation database.
- A.4 Continue evaluation of different approaches for global SST data assimilation and work on statistically based objective analysis approaches.
- A.5 Continue evaluation of high-speed network interconnection technologies with preliminary foci on ATM and LEC toll options.
- A.6 Provide investigator and staff support for the preceding items.
- A.7 Develop and submit Algorithm Theoretical Basis Document (ATBD).

B. Overview of Current Progress

B.1 September

B.1.1 A large part of the efforts during this quarter were focused in two areas: generation and submission of the Algorithm Theoretical Basis Document for the MODIS Infrared Algorithm and preparations for the MODIS Science Team meeting in late September. These efforts included consultation with Bob Evans and Howard Gordon to help coordinate and develop their Algorithm Theoretical Basis Documents. The ATBD efforts uncovered several areas of concern. First the volume of level-2 products exceeded our most pessimistic estimates. Second, the need for a secondary quality assessment dataset which could be much larger than the level-2 SST product set was not recognized until the ATBD was undertaken. On the

positive side, the ATBD process reinforced our belief that we could use the AVHRR Pathfinder efforts as a viable prototype for similar MODIS IR activities. The design of the quality assessment procedures, comparison database and calibration procedures parallel Pathfinder efforts. B.1.2 Review and comment on the Calibration ATBD and the PGS Toolkit in preparation for the MODIS Science Team Meeting took a great deal of the PI's time. We found that we cannot use the full recalibrated datastream and must instead take the level-1a (MOD02) data as our starting point for algorithm application. Factors in this decision are:

- 1) experience suggests that line-by-line recalibration will introduce unnecessary noise,
- 2) conversion of original counts to a 16-bit word with rescaling, histogram normalization and missing data insertion will not permit easy delineation of sensor artifacts in the level-1b dataset, and
- 3) while the calibration procedure apparently permits removal of non-linear effects, the algorithm proposed does not provide a method to calculate such.

As an aside, it is unclear how the cloud-flagging process will actually operate since it must use level-2 data to be effective. Thus, we have decided to use the thermal vacuum data from Hughes SBRC to derive our calibration model, use a lagged average calibration to reduce line-by-line noise in the raw data, and preserve the original spacecraft counts through the level-2 product.

The PGS toolkit is clearly in an evolutionary stage. This version focuses on very low-level interface issues, and provides a delineation between the ECS and SCF implementations. One particular aspect is of note: the need for totally different mechanisms for scripting in the two environments will probably cause major transition problems between the two architectures and should be addressed by development of a more common approach. B.2 Previous Months

B.2.1 August

August's efforts continued to focus on the generation and submission of the Algorithm Theoretical Basis Document for the MODIS Infrared Algorithm. This included continued consultation with Bob Evans and Howard Gordon to help coordinate and develop their Algorithm Theoretical Basis Documents.

B.2.2 July

All of July's efforts were focused on the generation and submission of the Algorithm Theoretical Basis Document for the MODIS Infrared Algorithm. This included consultation with Bob Evans and Howard Gordon to help coordinate and develop their Algorithm Theoretical Basis Documents.

C. Investigator Support

C.1 July

C.1.1 O. Brown - Team related effort

ATBD generation

C.1.2 G. Halliwell - Analyses efforts

C.1.3 S. Shenoi - Database and modeling efforts

C.2 August

C.2.1 O. Brown - Team related effort

ATBD generation

C.2.2 G. Halliwell - Analyses efforts

C.2.3 S. Shenoi - Database and modeling efforts

C.3 September

C.3.1 O. Brown - Team related effort

ATBD generation

Document Review

MODIS Meeting

C.3.2 G. Halliwell - Analyses efforts

C.3.3 S. Shenoi - Database and modeling efforts

D. Future Activities

D.1 Current - September

D.1.1 Algorithms

a. Continue to develop and test algorithms on global retrievals.

b. Evaluation of global data assimilation statistics for SST.

c. Configure and utilize various AFCRL transmission codes.

d. Revision of the ATBD

e. Implement ATM based network test bed.

f. Continued integration of new 100 Specmark+ workstations into algorithm development environment.

D.1.2 Investigator support - Continue current efforts. D.2 Previous Months

D.2.1 August - Algorithms

a. Continue to develop and test algorithms on global retrievals.

b. Evaluation of global data assimilation statistics for SST.

c. Configure and utilize various AFCRL transmission codes.

- d. Completion of the ATBD
- e. Implement ATM based network test bed.
- D.2.2 August - Investigator support - Continue current efforts.
- D.2.3. July - Algorithms
 - a. Continue to develop and test algorithms on global retrievals.
 - b. Evaluation of global data assimilation statistics for SST.
 - c. Configure and utilize various AFCRL transmission codes.
 - d. Revision of the ATBD
 - e. Implement ATM based network test bed.
 - f. Continued integration of new 100 Specmark+ workstations into algorithm development environment.
- D.2.4 July - Investigator support - Continue current efforts.
- E. Problems - No new problems to report.